Astron
Tables
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TABLES

FOR FINDING

THE DIRECTION OF THE MERIDIAN

AND

THE APPROXIMATE LOCAL TIME.

ADAPTED TO THE YEARS

1876, 1877, 1878.

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1876.

In consequence of the temporary stoppage of Dominion surveys, the completion of the printing of these Tables has been postponed.

The Tables printed are as follows :—

Tables of greatest elongation of Polaris for 1876, with auxiliary Table A for correcting the greatest elongation to the nearest minute of latitude.

Part of the Tables which shew the azimuth of Polaris when vertical with certain stars, and adapted for 1876, with that part of auxiliary Table B relating to each minute of latitude from 50° to 51°.

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INTRODUCTION.

The azimuth of a terrestrial mark is found by measuring the horizontal angle between it and some star whose azimuth at the instant of observation is known. The most suitable star for this purpose is Polaris, on account of the slowness of its motion; and the most suitable times for observing it are the instants of its greatest elongation east and west of the meridian; because at these instants the azimuth does not change, and also because the changes in azimuth a little before and a little after these instants are so slow, that any error in the time of the observation produces a much smaller error in the azimuth than would be the case at any other point in the star's course. Another advantage in observing the star at its greatest elongation consists in the fact that the time of occurrence is indicated by the apparent movement of the star along or parallel to the vertical wire of the telescope, so that the observation does not depend on a knowledge of correct time, as would be the case if Polaris were observed on the meridian (which is the very worst position which could be used for the purpose) or at any other point in its diurnal circle. The observer should, however, know the true time of greatest elongation, so that by the aid of a good common watch (whose error is approximately known) he may prepare himself for the observation.

The mean time of greatest elongation is found by applying to the time of upper transit the mean time interval between the times of upper transit and of greatest elongation.

As the greatest elongation of the Pole Star may occur when the sky is clouded, or at a time for which it may be inconvenient to wait, it is desirable to be provided with other means for determining the meridian.

The requisite means are provided in Tables III. to XV. in the accompanying collection, which shew approximately the time at which certain stars cross the vertical through Polaris, with the azimuth of Polaris at the same instant.

In the Tables published in 1873 the azimuth was given for the *mean* position of the star, and was affected, therefore, by errors of precession, nutation and aberration. In this collection the azimuths are given for

every *tenth day*, with a limit of error not exceeding 3″ of arc,* and are adapted, therefore, for the attainment of much closer accuracy.

Tables are also provided which give the time of upper transit of β Ursæ Minoris on every day of the year, the greatest elongation of the star for every tenth day, and the approximate time from transit at which the greatest elongation occurs.

If the latitude of the place be accurately known, the meridian may be laid down by observing the greatest elongation of β Ursæ Minoris with a limit of error of about 1″.5 of arc;* but owing to the large polar distance of this star, and the consequent large effect on the greatest elongation produced by a given error in latitude, as may be seen on examining Auxiliary Table C., it is better not to employ β Ursæ Minoris in laying down a meridian, except when Polaris is hidden by clouds.

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* The above limits have reference to full degrees of latitude; for intermediate latitudes the limits will be greater in each case by 1″.

EXPLANATION OF THE TABLES.

TIME OF TRANSIT OF POLARIS.

Table I. gives the mean astronomical time of the upper transit of Polaris over the meridian of longitude $6^h\ 0^m$ west of Greenwich on every day of the year.

In the computation of this table the R. A. of Polaris employed in every case is that proper to the noon which commences the astronomical day at Greenwich.

The error in the time occasioned by neglecting the change in the R. A. of Polaris is usually small, and in no case exceeds one second.

The time of transit over any other meridian may be found with sufficient accuracy by applying to the tabulated time a correction of 1 second for each 6 minutes by which the longitude differs from 6 hours, the correction being subtracted or added according as the longitude is greater or less than 6 hours.

*TABLES RELATING TO THE GREATEST ELONGATION OF POLARIS.

Table II. gives the approximate interval in mean time, for every degree of latitude from 47° to 55°, between the instant of the greatest western or eastern elongation of Polaris and the nearest upper transit (the preceding transit for western and the following transit for eastern elongation), with the angle of greatest elongation or azimuth of Polaris, the elongations being corrected for precession, nutation, and aberration for every *tenth day* in the year.

The elongation on intermediate days may be found with sufficient accuracy on the assumption that the change between any two tabulated numbers is in proportion to the time.

The greatest elongation corresponding to any latitude which lies between two full degrees is found from the elongation given in Table II. for the degree of latitude, by adding thereto the correction for minutes of latitude in Table A., pp. 104–105.

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* The limit of error in the time interval occasioned by precession, nutation, and aberration, will not exceed about one minute of time. The limit of error in the greatest elongation is 1″.5 of arc for full degrees of latitude, and 2″ for intermediate latitudes.

EXAMPLE.—Required the elongation of Polaris, Jan. 11, 1876, in latitude 48° 25′.

In Table II.—Gr. elongation, Jan. 11, lat. 48,	is	2° 0′	39″
In Table A.—Correction for	25′ "		59
Reqd. Gr. elongation	"	2 1	38

To find the Approximate Time of Greatest Western Elongation of Polaris, from the Tables.

If to the time of transit in Table I. the time interval in Table II. be added, the sum, if less than 24 hours, will be the time at which the greatest western elongation occurs; but if the sum thus obtained should exceed 24 hours, the time interval must be added to the time of transit for the *preceding* day; in which case the sum, diminished by 24 hours, will be the required time of greatest western elongation. On the day when Polaris crosses the meridian *twice*, the time of the *first* transit must be employed.

To find the Approximate Time of Greatest Eastern Elongation of Polaris.

Subtract the time interval in Table II. from the time of upper transit on the proposed day, unless the time of transit be less than the time interval, in which case the latter must be subtracted from the time of transit on the *following* day, increased by 24 hours. The remainder in either case will be the time of greatest eastern elongation. On the day when Polaris crosses the meridian *twice*, the time of *second* transit must be employed.

If the latitude of the place, and consequently the greatest elongation, be not exactly known, the error thereby introduced in the position of the meridian may be eliminated, if the star be visible both at its greatest eastern and greatest western elongation, by observing it at both these points. In this case, the middle of the two corresponding readings of the horizontal circle will be the meridian reading, provided that the instrument be not moved during the interval.

That the observer may know when to be in readiness for observing the greatest elongation of a star, it is requisite that he should know approximately the true local time, or the error of his watch.

This may be found by noting the time shewn by the watch when Polaris is seen on the same vertical with another star; and by comparing therewith the time derived from Tables III. to XV. as explained on p. x.

The arrival of the two stars on the same vertical may be ascertained by means of a plumb-line, in a sheltered position, (which may be immersed in water to check its oscillations,) the eye being so placed as to keep Polaris covered by the plumb-line.

TABLES RELATING TO THE AZIMUTH OF POLARIS WHEN VERTICAL WITH CERTAIN STARS, TABLES III. TO XV.

In Table III. the following data are given for different latitudes (47° to 55°).

The limit of error in the time intervals given in Tables III. to XV., occasioned by precession, nutation, and aberration, will amount to about $1\frac{1}{2}$ minute of time; and the limit of error in the azimuth of Polaris will be 3″ of arc nearly.*

(1.) The approximate interval in mean time between the instant of the upper transit of Polaris and the instant when the star η Ursæ Majoris crosses the vertical through Polaris and below it.

(2.) The azimuth of Polaris, for every tenth day of the year, at the instant when it crosses the vertical through η Ursæ Majoris.

(3.) A correction in seconds of arc to be applied to the tabulated azimuth, when Polaris is vertical with an imaginary star, whose declination is the same as that of η Ursæ Majoris, and whose R. A. differs from that of η Ursæ Majoris by 100 seconds of time.

The rule for applying this correction will be explained on p. x.

Tables IV. to XV. shew analogous quantities for twelve other stars.

The azimuth corresponding to any latitude which lies between two full degrees is found from the tabulated azimuths in Tables III.–IV.; for the degree of latitude by adding thereto the correction for minutes of latitude in Table B., pp. 106-121.

Any star crosses the vertical through Polaris twice in twenty-four hours, once above Polaris and once below it. The second time alone is considered in these thirteen tables, so that the star which is vertical with Polaris is always moving from left to right when near the common vertical.

To find from the Tables the time at which Polaris is vertical with another Star, Polaris being West of the Meridian.

If to the time of transit given in Table I. the time interval be added, the sum, if less than 24 hours, will be the time required; but if the sum thus obtained be greater than 24 hours, the time interval must be added to the time of transit on the preceding day; in which case the sum, diminished by 24 hours, will be the required time. On the day in which Polaris crosses the meridian twice, the time of the first transit must be employed.

* See foot note, p. vi.

To find the Time when Polaris is vertical with another Star, Polaris being East of the Meridian.

Subtract the time interval from the time of transit on the proposed day, unless this be less than the time interval, in which case the latter must be subtracted from the time of transit on the *following* day, increased by 24 hours. The remainder, in either case, will be the time at which Polaris is vertical with the star in combination with it.

On the day when Polaris crosses the meridian twice, the second transit must be employed.

To determine the Meridian by observing the Azimuth of Polaris when it is on the same vertical with another Star.

(1.) About ten minutes before the event adjust the telescope of the theodolite, so as to bring Polaris on the middle vertical wire, and slowly move the telescope in azimuth, to preserve the coincidence.

(2.) When the lower star appears by the eye or by a plumb line to be nearly on the field of view of the telescope, if suitably depressed in that vertical, let the telescope be depressed until the star appears on the field.

(3.) Elevate the telescope to Polaris, and rapidly readjust its azimuth.

(4.) Depress the telescope till the lower star reaches the middle vertical wire.

(5.) Elevate the telescope to Polaris, and if the star has visibly moved in azimuth, let the telescope be also moved in azimuth, till the vertical wire nearly reaches the new position of Polaris.

(6.) The sum or difference of the tabular azimuth and the reading of the horizontal circle in the final position of the instrument, will be the meridian reading.

The process of finding the meridian by observing the azimuth of Polaris at or near the time when it is vertical with another star, may be facilitated by means of the difference for 100^s given at the foot of the second page of the Tables III. to XV.

(1.) A few seconds before the lower star reaches the vertical through Polaris, bring the middle vertical wire to accurate coincidence with Polaris, and note the time by a watch.

(2.) Depress the telescope in readiness for the passage of the lower star; note the time when it passes the middle wire, and take the difference (n) in seconds between the two readings of the watch.*

* It is not desirable that the interval (n) should exceed 2 minutes; if, therefore, in watching the ower star, the observer judges that more than two minutes will elapse before its arrival on the wire, he should readjust the telescope to Polaris, and repeat the operation.

(3.) Multiply the difference for 100^s at the foot of the Tables III.–XV. by (n) and divide by 100.

The result is the correction to be applied with its proper sign to the tabulated azimuth.

(4.) The tabulated azimuth, thus corrected, is the azimuth of Polaris when on the same vertical with an imaginary star, differing in R. A. by (n) seconds from the star in the table.

The sum or difference of this corrected azimuth and the reading of the horizontal circle will be the reading of that circle when the telescope is in the meridian.

In employing Tables III.–XV. for laying down a meridian time, it is better to select the combinations in which Polaris is near its greatest elongation, as its motion in azimuth is then very slow, and the arrival of the two stars in the same vertical may be, therefore, observed with greater facility. When Polaris is at other parts of its course, greater skill is demanded in manipulating the instrument; but considerable accuracy is attainable by employing the method described at the foot of p. x.

The manner of using Tables XVI., XVII., and Auxiliary Table C., relative to transit of β Ursæ Minoris and its greatest elongation, is identical with that employed for the corresponding tables for Polaris, p. viii.

Table D.

The object of Table D. is to enable the observer to see at a glance which of the several events given in the previous tables are available on any given night in the year, and also the order and, approximately, the times of their occurrence.

In column (1) are given the several events in order, and in column (2) the approximate time since the upper transit of Polaris.

To find the Time approximately when any Event occurs, by means of Table D.

If to the time at which Polaris crosses the meridian on the proposed day, the time in column (2) be added, the sum, if less than 24 hours, will be the time of the event; but should the sum thus obtained be greater than 24 hours, the time in column (2) must be added to the time at which Polaris crosses the meridian on the *preceding* day; in which case the sum, diminished by 24 hours, will be the time required.

Having ascertained by table D whether the event will occur in daylight or at night, the observer should then compute the time more exactly by the methods before described.

TABLES.

TABLE I.—1876.

Mean Time of Upper Transit of POLARIS for Meridian of $6^h\ 0^m$ West.

	January.	February.	March.	April.	May.	June.
	h m s	h m s	h m s	h m s	h m s	h m s
1	6 29 4	4 26 43	2 32 20	0 30 18	22 28 31	20 26 57
2	6 25 7	4 22 46	2 28 24	0 26 22	22 24 35	20 23 2
3	6 21 10	4 18 49	2 24 28	0 22 26	22 20 40	20 19 7
4	6 17 14	4 14 53	2 20 31	0 18 30	22 16 45	20 15 12
5	6 13 17	4 10 56	2 16 35	0 14 34	22 12 49	20 11 17
6	6 9 20	4 6 59	2 12 38	0 10 38	22 8 54	20 7 22
7	6 5 23	4 3 2	2 8 42	0 6 42	22 4 59	20 3 27
8	6 1 26	3 59 6	2 4 45	0 2 46 23 58 51	22 1 3	19 59 32
9	5 57 30	3 55 9	2 0 49	23 54 55	21 57 8	19 55 37
10	5 53 33	3 51 12	1 56 53	23 50 59	21 53 12	19 51 42
11	5 49 36	3 47 15	1 52 56	23 47 3	21 49 17	19 47 47
12	5 45 39	3 43 19	1 49 0	23 43 7	21 45 22	19 43 52
13	5 41 42	3 39 22	1 45 4	23 39 12	21 41 27	19 39 57
14	5 37 46	3 35 26	1 41 8	23 35 16	21 37 31	19 36 2
15	5 33 49	3 31 29	1 37 11	23 31 20	21 33 36	19 32 7
16	5 29 52	3 27 32	1 33 15	23 27 24	21 29 41	19 28 12
17	5 25 55	3 23 36	1 29 19	23 23 29	21 25 45	19 24 17
18	5 21 58	3 19 39	1 25 23	23 19 33	21 21 50	19 20 22
19	5 18 2	3 15 43	1 21 26	23 15 37	21 17 55	19 16 27
20	5 14 5	3 11 46	1 17 30	23 11 41	21 13 59	19 12 32
21	5 10 8	3 7 49	1 13 34	23 7 46	21 10 4	19 8 37
22	5 6 11	3 3 53	1 9 38	23 3 50	21 6 9	19 4 42
23	5 2 14	2 59 56	1 5 42	22 59 55	21 2 14	19 0 47
24	4 58 17	2 56 0	1 1 46	22 55 59	20 58 19	18 56 52
25	4 54 21	2 52 3	0 57 50	22 52 4	20 54 24	18 52 57
26	4 50 24	2 48 7	0 53 54	22 48 8	20 50 28	18 49 2
27	4 46 27	2 44 10	0 49 58	22 44 13	20 46 33	18 45 7
28	4 42 30	2 40 14	0 46 2	22 40 17	20 42 38	18 41 12
29	4 38 33	2 36 17	0 42 6	22 36 22	20 38 43	18 37 17
30	4 34 36		0 38 10	22 32 26	20 34 48	18 33 22
31	4 30 40		0 34 14		20 30 53	

TABLE I.—1876 (*continued*).

Mean Time of Upper Transit of POLARIS for Meridian of $6^h\ 0^m$ West.

	July.	August.	September.	October.	November.	December.
	h m s	h m s	h m s	h m s	h m s	h m s
1	18 29 27	16 28 2	14 26 32	12 28 47	10 26 55	8 28 45
2	18 25 32	16 24 7	14 22 37	12 24 52	10 22 59	8 24 49
3	18 21 37	16 20 12	14 18 41	12 20 56	10 19 2	8 20 52
4	18 17 42	16 16 17	14 14 46	12 17 0	10 15 6	8 16 56
5	18 13 47	16 12 22	14 10 51	12 13 4	10 11 10	8 12 59
6	18 9 52	16 8 27	14 6 55	12 9 9	10 7 14	8 9 2
7	18 5 57	16 4 32	14 3 0	12 5 13	10 3 18	8 5 6
8	18 2 2	16 0 37	13 59 5	12 1 17	9 59 21	8 1 9
9	17 58 7	15 56 41	13 55 9	11 57 22	9 55 25	7 57 13
10	17 54 12	15 52 46	13 51 14	11 53 26	9 51 29	7 53 16
11	17 50 17	15 48 51	13 47 19	11 49 30	9 47 33	7 49 19
12	17 46 22	15 44 56	13 43 23	11 45 34	9 43 36	7 45 23
13	17 42 27	15 41 1	13 39 28	11 41 39	9 39 40	7 41 26
14	17 38 32	15 37 6	13 35 32	11 37 43	9 35 44	7 37 29
15	17 34 37	15 33 10	13 31 37	11 33 47	9 31 48	7 33 33
16	17 30 42	15 29 15	13 27 41	11 29 51	9 27 51	7 29 36
17	17 26 47	15 25 20	13 23 46	11 25 55	9 23 55	7 25 39
18	17 22 52	15 21 25	13 19 50	11 21 59	9 19 59	7 21 43
19	17 18 57	15 17 30	13 15 54	11 18 3	9 16 3	7 17 46
20	17 15 2	15 13 35	13 11 59	11 14 7	9 12 6	7 13 49
21	17 11 7	15 9 39	13 8 3	11 10 12	9 8 10	7 9 53
22	17 7 12	15 5 44	13 4 8	11 6 15	9 4 14	7 5 56
23	17 3 17	15 1 49	13 0 12	11 2 19	9 0 17	7 1 59
24	16 59 22	14 57 54	12 56 17	10 58 23	8 56 21	6 58 2
25	16 55 27	14 53 59	12 52 21	10 54 27	8 52 24	6 54 6
26	16 51 32	14 50 3	12 48 25	10 50 31	8 48 28	6 50 9
27	16 47 37	14 46 8	12 44 30	10 46 35	8 44 31	6 46 12
28	16 43 42	14 42 13	12 40 34	10 42 39	8 40 35	6 42 15
29	16 39 47	14 38 18	12 36 39	10 38 43	8 36 38	6 38 19
30	16 35 52	14 34 22	12 32 43	10 34 47	8 32 42	6 34 22
31	16 31 57	14 30 27		10 30 51		6 30 25

TABLE II.—1876.

Greatest Elongation of POLARIS, with interval in Mean Time between the instant of the Upper Transit and the instant of its Greatest Elongation.

Latitude.		47°	48°	49°	50°	51°	52°	53°	54°	55°
Time Interval.		h m s 5 53 15	h m s 5 53 2	h m s 5 52 49	h m s 5 52 36	h m s 5 52 22	h m s 5 52 7	h m s 5 51 52	h m s 5 51 36	h m s 5 51 19
Jan.	1	° ′ ″ 1 58 24	° 2 0 40	° 2 3 5	° 2 5 37	° 2 8 19	° 2 11 10	° 2 14 11	° 2 17 24	° 2 20 47
"	11	1 58 22	2 0 39	2 3 4	2 5 36	2 8 18	2 11 8	2 14 10	2 17 22	2 20 46
"	21	1 58 22	2 0 39	2 3 4	2 5 36	2 8 18	2 11 8	2 14 10	2 17 22	2 20 46
"	31	1 58 23	2 0 40	2 3 4	2 5 37	2 8 18	2 11 9	2 14 10	2 17 23	2 20 46
Feb.	10	1 58 25	2 0 41	2 3 6	2 5 39	2 8 20	2 11 11	2 14 12	2 17 25	2 20 48
"	20	1 58 27	2 0 44	2 3 9	2 5 41	2 8 23	2 11 14	2 14 15	2 17 28	2 20 51
Mar.	1	1 58 30	2 0 47	2 3 12	2 5 45	2 8 26	2 11 17	2 14 19	2 17 31	2 20 55
"	11	1 58 34	2 0 51	2 3 16	2 5 49	2 8 31	2 11 21	2 14 23	2 17 36	2 21 0
"	21	1 58 39	2 0 56	2 3 20	2 5 53	2 8 35	2 11 26	2 14 28	2 17 41	2 21 5
"	31	1 58 43	2 1 0	2 3 25	2 5 58	2 8 40	2 11 31	2 14 33	2 17 46	2 21 10
April	10	1 58 48	2 1 5	2 3 30	2 6 3	2 8 45	2 11 36	2 14 38	2 17 51	2 21 15
"	20	1 58 52	2 1 9	2 3 34	2 6 8	2 8 50	2 11 41	2 14 43	2 17 57	2 21 21
"	30	1 58 56	2 1 14	2 3 39	2 6 12	2 8 54	2 11 46	2 14 48	2 18 1	2 21 26
May	10	1 59 0	2 1 17	2 3 42	2 6 16	2 8 58	2 11 50	1 14 52	2 18 5	2 21 30
"	20	1 59 3	2 1 20	2 3 45	2 6 19	2 9 1	2 11 53	2 14 55	2 18 9	2 21 33
"	30	1 59 5	2 1 22	2 3 48	2 6 21	2 9 4	2 11 55	2 14 58	2 18 12	2 21 36
June	9	1 59 7	2 1 24	2 3 50	2 6 23	2 9 6	2 11 57	2 15 0	2 18 14	2 21 38
"	19	1 59 7	2 1 25	2 3 50	2 6 24	2 9 6	2 11 58	2 15 0	2 18 14	2 21 39
"	29	1 59 7	2 1 25	2 3 50	2 6 24	2 9 6	2 11 58	2 15 0	2 18 14	2 21 39

TABLE II.—1876 (*continued*).

Greatest Elongation of POLARIS, with interval in Mean Time between the instant of the Upper Transit and the instant of its Greatest Elongation.

Latitude.		47°	48°	49°	50°	51°	52°	53°	54°	55°
Time Interval.		h m s 5 53 15	h m s 5 53 2	h m s 5 52 49	h m s 5 52 36	h m s 5 52 22	h m s 5 52 7	h m s 5 51 52	h m s 5 51 36	h m s 5 51 19
July	9	° ′ ″ 1 59 7	° ′ ″ 2 1 24	° ′ ″ 2 3 50	° ′ ″ 2 6 23	° ′ ″ 2 9 6	° ′ ″ 2 11 57	° ′ ″ 2 15 0	° ′ ″ 2 18 13	° ′ ″ 2 21 38
"	19	1 59 5	2 1 22	2 3 48	2 6 21	2 9 4	2 11 55	2 14 58	2 18 11	2 21 36
"	29	1 59 2	2 1 20	2 3 45	2 6 19	2 9 1	2 11 52	2 14 55	2 18 8	2 21 33
Aug.	8	1 58 59	2 1 17	2 3 42	2 6 15	2 8 58	2 11 49	2 14 52	2 18 5	2 21 30
"	18	1 58 56	2 1 13	2 3 38	2 6 12	2 8 54	2 11 45	2 14 48	2 18 1	2 21 25
"	28	1 58 51	2 1 9	2 3 34	2 6 7	2 8 49	2 11 40	2 14 42	2 17 56	2 21 20
Sept.	7	1 58 46	2 1 3	2 3 29	2 6 2	2 8 44	2 11 35	2 14 37	2 17 50	2 21 14
"	17	1 58 41	2 0 58	2 3 23	2 5 56	2 8 38	2 11 29	2 14 31	2 17 44	2 21 8
"	27	1 58 36	2 0 53	2 3 18	2 5 51	2 8 33	2 11 23	2 14 25	2 17 38	2 21 2
Oct.	7	1 58 30	2 0 47	2 3 12	2 5 44	2 8 26	2 11 17	2 14 19	2 17 31	2 20 55
"	17	1 58 25	2 0 41	2 3 6	2 5 38	2 8 20	2 11 11	2 14 12	2 17 25	2 20 48
"	27	1 58 19	2 0 36	2 3 0	2 5 33	2 8 14	2 11 4	2 14 6	2 17 18	2 20 42
Nov.	6	1 58 14	2 0 30	2 2 54	2 5 27	2 8 8	2 10 58	2 14 0	2 17 12	2 20 35
"	16	1 58 8	2 0 25	2 2 49	2 5 21	2 8 2	2 10 52	2 13 54	2 17 6	2 20 29
"	26	1 58 4	2 0 20	2 2 44	2 5 16	2 7 58	2 10 48	2 13 49	2 17 1	2 20 23
Dec.	6	1 58 0	2 0 16	2 2 40	2 5 12	2 7 53	2 10 43	2 13 44	2 16 56	2 20 19
"	16	1 57 56	2 0 12	2 2 37	2 5 9	2 7 49	2 10 39	2 13 40	2 16 52	2 20 15
"	26	1 57 54	2 0 10	2 2 34	2 5 6	2 7 47	2 10 36	2 13 37	2 16 49	2 20 11

TABLE III.—1876.

Azimuth of POLARIS when vertical with η URSÆ MAJORIS, Polaris being WEST of the meridian and moving WEST.

The "Time Interval" at the head of the Table shews the time at which Polaris is vertical with the Star, reckoning from the preceding transit of Polaris.

Latitude.		47°	48°	49°	50°	51°	52°	53°	54°	55°
Time Interval.		h m s 0 27 35	h m s 0 27 34	h m s 0 27 32	h m s 0 27 30	h m s 0 27 29	h m s 0 27 27	h m s 0 27 25	h m s 0 27 23	h m s 0 27 21
Jan.	1	° ′ ″ 0 14 50	° ′ ″ 0 15 7	° ′ ″ 0 15 25	° ′ ″ 0 15 44	° ′ ″ 0 16 4	° ′ ″ 0 16 25	° ′ ″ 0 16 48	° ′ ″ 0 17 12	° ′ ″ 0 17 38
"	11	0 14 54	0 15 11	0 15 29	0 15 48	0 16 9	0 16 30	0 16 53	0 17 17	0 17 43
"	21	0 14 59	0 15 16	0 15 34	0 15 54	0 16 14	0 16 36	0 16 58	0 17 23	0 17 49
"	31	0 15 4	0 15 21	0 15 39	0 15 59	0 16 19	0 16 41	0 17 4	0 17 28	0 17 54
Feb.	10	0 15 8	0 15 25	0 15 44	0 16 3	0 16 24	0 16 46	0 17 9	0 17 34	0 18 0
"	20	0 15 12	0 15 30	0 15 48	0 16 8	0 16 28	0 16 50	0 17 14	0 17 38	0 18 4
Mar.	1	0 15 16	0 15 33	0 15 52	0 16 12	0 16 33	0 16 55	0 17 18	0 17 43	0 18 9
"	11	0 15 19	0 15 37	0 15 55	0 16 15	0 16 36	0 16 58	0 17 21	0 17 46	0 18 13
"	21	0 15 21	0 15 39	0 15 58	0 16 17	0 16 38	0 17 0	0 17 24	0 17 49	0 18 15
"	31	0 15 22	0 15 40	0 15 59	0 16 19	0 16 40	0 17 2	0 17 25	0 17 50	0 18 17
April	10	0 15 23	0 15 41	0 16 0	0 16 19	0 16 40	0 17 2	0 17 26	0 17 51	0 18 18
"	20	0 15 23	0 15 40	0 15 59	0 16 19	0 16 40	0 17 2	0 17 26	0 17 51	0 18 17
"	30	0 15 21	0 15 39	0 15 58	0 16 17	0 16 38	0 17 1	0 17 24	0 17 49	0 18 15
May	10	0 15 19	0 15 37	0 15 55	0 16 15	0 16 36	0 16 58	0 17 21	0 17 46	0 18 13
"	20	0 15 16	0 15 34	0 15 53	0 16 12	0 16 33	0 16 55	0 17 18	0 17 43	0 18 9
"	30	0 15 13	0 15 30	0 15 49	0 16 8	0 16 29	0 16 51	0 17 14	0 17 39	0 18 5
June	9	0 15 9	0 15 26	0 15 44	0 16 4	0 16 25	0 16 46	0 17 10	0 17 34	0 18 0
"	19	0 15 4	0 15 21	0 15 40	0 15 59	0 16 20	0 16 42	0 17 5	0 17 29	0 17 55
"	29	0 15 0	0 15 17	0 15 35	0 15 54	0 16 15	0 16 36	0 16 59	0 17 24	0 17 50

TABLE III.—1876 (*continued*).

Azimuth of POLARIS when vertical with η URSÆ MAJORIS, Polaris being WEST of the meridian and moving WEST.

The "Time Interval" at the head of the Table shows the time at which Polaris is vertical with the Star, reckoning from the preceding transit of Polaris.

Latitude.		47°	48°	49°	50°	51°	52°	53°	54°	55°
Time Interval.		h m s 0 27 35	h m s 0 27 34	h m s 0 27 32	h m s 0 27 30	h m s 0 27 29	h m s 0 27 27	h m s 0 27 25	h m s 0 27 23	h m s 0 27 21
July	9	° ′ ″ 0 14 55	° ′ ″ 0 15 12	° ′ ″ 0 15 30	° ′ ″ 0 15 49	° ′ ″ 0 16 9	° ′ ″ 0 16 31	° ′ ″ 0 16 54	° ′ ″ 0 17 18	° ′ ″ 0 17 44
"	19	0 14 49	0 15 7	0 15 25	0 15 44	0 16 4	0 16 25	0 16 48	0 17 12	0 17 38
"	29	0 14 45	0 15 2	0 15 20	0 15 39	0 15 59	0 16 20	0 16 43	0 17 6	0 17 32
Aug.	8	0 14 40	0 14 57	0 15 15	0 15 34	0 15 54	0 16 15	0 16 37	0 17 1	0 17 27
"	18	0 14 36	0 14 52	0 15 10	0 15 29	0 15 49	0 16 10	0 16 32	0 16 56	0 17 21
"	28	0 14 31	0 14 48	0 15 6	0 15 25	0 15 44	0 16 5	0 16 28	0 16 51	0 17 16
Sept.	7	0 14 28	0 14 45	0 15 2	0 15 21	0 15 41	0 16 2	0 16 24	0 16 47	0 17 12
"	17	0 14 25	0 14 42	0 14 59	0 15 18	0 15 37	0 15 58	0 16 20	0 16 44	0 17 9
"	27	0 14 22	0 14 39	0 14 56	0 15 15	0 15 35	0 15 55	0 16 17	0 16 41	0 17 5
Oct.	7	0 14 21	0 14 37	0 14 55	0 15 13	0 15 33	0 15 53	0 16 15	0 16 38	0 17 3
"	17	0 14 20	0 14 36	0 14 54	0 15 12	0 15 32	0 15 52	0 16 14	0 16 37	0 17 2
"	27	0 14 19	0 14 36	0 14 53	0 15 12	0 15 31	0 15 52	0 16 14	0 16 37	0 17 2
Nov.	6	0 14 19	0 14 36	0 14 53	0 15 12	0 15 31	0 15 52	0 16 14	0 16 37	0 17 2
"	16	0 14 21	0 14 37	0 14 55	0 15 13	0 15 33	0 15 53	0 16 15	0 16 39	0 17 3
"	26	0 14 23	0 14 39	0 14 57	0 15 16	0 15 35	0 15 56	0 16 18	0 16 41	0 17 6
Dec.	6	0 14 25	0 14 42	0 15 0	0 15 18	0 15 38	0 15 59	0 16 21	0 16 44	0 17 9
"	16	0 14 29	0 14 45	0 15 3	0 15 22	0 15 41	0 16 2	0 16 24	0 16 48	0 17 13
"	26	0 14 33	0 14 49	0 15 7	0 15 26	0 15 46	0 16 7	0 16 29	0 16 53	0 17 18
Difference for 100s.		− 100″	− 102″	− 104″	− 106″	− 109″	− 111″	− 113″	− 116″	− 119″

TABLE IV.—1876.

Azimuth of POLARIS when vertical with β DRACONIS, Polaris being WEST of the meridian and moving WEST.

The "Time Interval" at the head of the Table shews the time at which Polaris is vertical with the Star, reckoning from the preceding transit of Polaris.

Latitude.		47°	48°	49°	50°	51°	52°	53°	54°	55°
Time Interval.		h m s 4 2 10	h m s 4 1 59	h m s 4 1 48	h m s 4 1 36	h m s 4 1 24	h m s 4 1 11	h m s 4 0 58	h m s 4 0 44	h m s 4 0 29
Jan.	1	° ′ ″ 1 44 38	° ′ ″ 1 46 39	° ′ ″ 1 48 46	° ′ ″ 1 51 1	° ′ ″ 1 53 24	° ′ ″ 1 55 55	° ′ ″ 1 58 34	° ′ ″ 2 1 24	° ′ ″ 2 4 25
"	11	1 44 39	1 46 40	1 48 47	1 51 2	1 53 25	1 55 56	1 58 35	2 1 25	2 4 26
"	21	1 44 41	1 46 42	1 48 50	1 51 5	1 53 27	1 55 58	1 58 38	2 1 28	2 4 28
"	31	1 44 44	1 46 45	1 48 53	1 51 8	1 53 30	1 56 1	1 58 41	2 1 31	2 4 32
Feb.	10	1 44 47	1 46 48	1 48 56	1 51 11	1 53 34	1 56 5	1 58 45	2 1 35	2 4 36
"	20	1 44 51	1 46 52	1 49 0	1 51 15	1 53 39	1 56 10	1 58 50	2 1 40	2 4 41
Mar.	1	1 44 56	1 46 57	1 49 5	1 51 20	1 53 43	1 56 14	1 58 55	2 1 45	2 4 46
"	11	1 45 0	1 47 2	1 49 10	1 51 25	1 53 48	1 56 20	1 59 0	2 1 50	2 4 52
"	21	1 45 5	1 47 6	1 49 15	1 51 30	1 53 53	1 56 25	1 59 5	2 1 56	2 4 57
"	31	1 45 9	1 47 10	1 49 19	1 51 34	1 53 58	1 56 29	1 59 10	2 2 0	2 5 2
April	10	1 45 13	1 47 15	1 49 23	1 51 39	1 54 2	1 56 34	1 59 15	2 2 5	2 5 7
"	20	1 45 17	1 47 18	1 49 27	1 51 43	1 54 6	1 56 38	1 59 19	2 2 9	2 5 11
"	30	1 45 20	1 47 21	1 49 30	1 51 46	1 54 9	1 56 41	1 59 22	2 2 13	2 5 14
May	10	1 45 21	1 47 23	1 49 32	1 51 47	1 54 11	1 56 43	1 59 24	2 2 15	2 5 17
"	20	1 45 22	1 47 24	1 49 33	1 51 48	1 54 12	1 56 44	1 59 25	2 2 16	2 5 18
"	30	1 45 23	1 47 24	1 49 33	1 51 49	1 54 13	1 56 44	1 59 25	2 2 16	2 5 18
June	9	1 45 22	1 47 24	1 49 33	1 51 48	1 54 12	1 56 44	1 59 25	2 2 16	2 5 17
"	19	1 45 20	1 47 22	1 49 31	1 51 46	1 54 10	1 56 42	1 59 23	2 2 14	2 5 15
"	29	1 45 18	1 47 20	1 49 29	1 51 44	1 54 8	1 56 40	1 59 20	2 2 11	2 5 13

TABLE IV.—1876 (*continued*).

Azimuth of POLARIS when vertical with β DRACONIS, Polaris being WEST of the meridian and moving WEST.

The "Time Interval" at the head of the Table shews the time at which Polaris is vertical with the Star, reckoning from the preceding transit of Polaris.

Latitude.	47°	48°	49°	50°	51°	52°	53°	54°	55°
Time Interval.	h m s 4 2 10	h m s 4 1 59	h m s 4 1 48	h m s 4 1 36	h m s 4 1 24	h m s 4 1 11	h m s 4 0 58	h m s 4 0 44	h m s 4 0 29
July 9	° ′ ″ 1 45 15	° ′ ″ 1 47 17	° ′ ″ 1 49 26	° ′ ″ 1 51 41	° ′ ″ 1 54 5	° ′ ″ 1 56 36	° ′ ″ 1 59 17	° ′ ″ 2 2 8	° ′ ″ 2 5 9
" 19	1 45 12	1 47 13	1 49 22	1 51 37	1 54 1	1 56 32	1 59 13	2 2 3	2 5 5
" 29	1 45 7	1 47 9	1 49 17	1 51 32	1 53 56	1 56 27	1 59 8	2 1 58	2 5 0
Aug. 8	1 45 3	1 47 4	1 49 12	1 51 28	1 53 51	1 56 22	1 59 3	2 1 53	2 4 54
" 18	1 44 58	1 46 59	1 49 7	1 51 22	1 53 45	1 56 17	1 58 57	2 1 47	2 4 48
" 28	1 44 52	1 46 53	1 49 1	1 51 16	1 53 39	1 56 10	1 58 50	2 1 41	2 4 42
Sept. 7	1 44 46	1 46 47	1 48 55	1 51 10	1 53 33	1 56 4	1 58 44	2 1 34	2 4 35
" 17	1 44 41	1 46 42	1 48 49	1 51 4	1 53 27	1 55 58	1 58 38	2 1 27	2 4 28
" 27	1 44 35	1 46 36	1 48 44	1 50 58	1 53 21	1 55 52	1 58 31	2 1 21	2 4 21
Oct. 7	1 44 29	1 46 30	1 48 38	1 50 52	1 53 15	1 55 45	1 58 25	2 1 14	2 4 15
" 17	1 44 24	1 46 25	1 48 32	1 50 47	1 53 9	1 55 40	1 58 19	2 1 8	2 4 9
" 27	1 44 20	1 46 20	1 48 27	1 50 42	1 53 4	1 55 34	1 58 14	2 1 3	2 4 3
Nov. 6	1 44 15	1 46 15	1 48 23	1 50 37	1 52 59	1 55 29	1 58 8	2 0 58	2 3 58
" 16	1 44 11	1 46 12	1 48 19	1 50 33	1 52 55	1 55 25	1 58 4	2 0 53	2 3 53
" 26	1 44 9	1 46 9	1 48 16	1 50 30	1 52 52	1 55 22	1 58 1	2 0 50	2 3 50
Dec. 6	1 44 7	1 46 7	1 48 14	1 50 28	1 52 50	1 55 20	1 57 59	2 0 48	2 3 48
" 16	1 44 5	1 46 5	1 48 13	1 50 27	1 52 49	1 55 19	1 57 57	2 0 46	2 3 46
" 26	1 44 5	1 46 5	1 48 12	1 50 26	1 52 48	1 55 18	1 57 57	2 0 46	2 3 46
Difference for 100s.	−48″	−49″	−50″	−51″	−52″	−53″	−54″	−56″	−57″

TABLE V.—1876.

Azimuth of POLARIS when vertical with γ DRACONIS, Polaris being WEST of the meridian and moving WEST.

The "Time Interval" at the head of the Table shews the time at which Polaris is vertical with the Star, reckoning from the preceding transit of Polaris.

Latitude.		47°	48°	49°	50°	51°	52°	53°	54°	55°
Time Interval.		h m s 4 27 48	h m s 4 27 36	h m s 4 27 24	h m s 4 27 12	h m s 4 26 59	h m s 4 26 45	h m s 4 26 31	h m s 4 26 16	h m s 4 26 1
		° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
Jan.	1	1 50 14	1 52 20	1 54 35	1 56 57	1 59 27	2 2 6	2 4 55	2 7 53	2 11 4
"	11	1 50 14	1 52 21	1 54 36	1 56 57	1 59 28	2 2 7	2 4 55	2 7 54	2 11 5
"	21	1 50 16	1 52 23	1 54 37	1 56 59	1 59 30	2 2 9	2 4 57	2 7 56	2 11 7
"	31	1 50 18	1 52 25	1 54 40	1 57 2	1 59 32	2 2 11	2 5 0	2 7 59	2 11 10
Feb.	10	1 50 21	1 52 28	1 54 43	1 57 5	1 59 36	2 2 15	2 5 3	2 8 2	2 11 13
"	20	1 50 25	1 52 32	1 54 47	1 57 9	1 59 40	2 2 19	2 5 8	2 8 7	2 11 18
Mar.	1	1 50 29	1 52 36	1 54 51	1 57 13	1 59 44	2 2 23	2 5 12	2 8 12	2 11 23
"	11	1 50 34	1 52 41	1 54 56	1 57 18	1 59 49	2 2 29	2 5 18	2 8 17	2 11 28
"	21	1 50 38	1 52 46	1 55 1	1 57 23	1 59 54	2 2 34	2 5 23	2 8 22	2 11 33
"	31	1 50 43	1 52 50	1 55 5	1 57 28	1 59 59	2 2 38	2 5 28	2 8 27	2 11 39
April	10	1 50 47	1 52 54	1 55 10	1 57 32	2 0 4	2 2 43	2 5 33	2 8 32	2 11 44
"	20	1 50 51	1 52 58	1 55 14	1 57 36	2 0 8	2 2 48	2 5 37	2 8 37	2 11 48
"	30	1 50 54	1 53 2	1 55 17	1 57 40	2 0 11	2 2 51	2 5 41	2 8 41	2 11 52
May	10	1 50 56	1 53 4	1 55 20	1 57 42	2 0 14	2 2 54	2 5 43	2 8 43	2 11 55
"	20	1 50 58	1 53 5	1 55 21	1 57 44	2 0 15	2 2 55	2 5 45	2 8 45	2 11 57
"	30	1 50 59	1 53 6	1 55 22	1 57 45	2 0 16	2 2 56	2 5 46	2 8 46	2 11 58
June	9	1 50 59	1 53 6	1 55 22	1 57 45	2 0 16	2 2 56	2 5 46	2 8 46	2 11 58
"	19	1 50 57	1 53 5	1 55 21	1 57 43	2 0 15	2 2 55	2 5 45	2 8 44	2 11 56
"	29	1 50 56	1 53 3	1 55 19	1 57 42	2 0 13	2 2 53	2 5 43	2 8 42	2 11 54

TABLE V.—1876 (*continued*).

Azimuth of POLARIS when vertical with γ DRACONIS, Polaris being WEST of the meridian and moving WEST.

The "Time Interval" at the head of the Table shews the time at which Polaris is vertical with the Star, reckoning from the preceding transit of Polaris.

Latitude.		47°	48°	49°	50°	51°	52°	53°	54°	55°
Time Interval.		h m s 4 27 48	h m s 4 27 36	h m s 4 27 24	h m s 4 27 12	h m s 4 26 59	h m s 4 26 45	h m s 4 26 31	h m s 4 26 16	h m s 4 26 1
		° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
July	9	1 50 53	1 53 1	1 55 16	1 57 39	2 0 11	2 2 50	2 5 40	2 8 40	2 11 51
"	19	1 50 50	1 52 57	1 55 13	1 57 35	2 0 7	2 2 46	2 5 36	2 8 36	2 11 47
"	29	1 50 46	1 52 53	1 55 9	1 57 31	2 0 3	2 2 42	2 5 31	2 8 31	2 11 43
Aug.	8	1 50 42	1 52 49	1 55 4	1 57 27	1 59 58	2 2 37	2 5 27	2 8 26	2 11 37
"	18	1 50 37	1 52 44	1 54 59	1 57 22	1 59 53	2 2 32	2 5 21	2 8 21	2 11 32
"	28	1 50 31	1 52 38	1 54 54	1 57 16	1 59 47	2 2 26	2 5 15	2 8 14	2 11 25
Sept.	7	1 50 26	1 52 33	1 54 48	1 57 10	1 59 41	2 2 20	2 5 8	2 8 7	2 11 18
"	17	1 50 20	1 52 27	1 54 42	1 57 4	1 59 35	2 2 13	2 5 2	2 8 1	2 11 12
"	27	1 50 14	1 52 21	1 54 36	1 56 58	1 59 28	2 2 7	2 4 56	2 7 54	2 11 5
Oct.	7	1 50 9	1 52 15	1 54 30	1 56 52	1 59 22	2 2 1	2 4 49	2 7 48	2 10 58
"	17	1 50 3	1 52 10	1 54 24	1 56 46	1 59 16	2 1 55	2 4 43	2 7 41	2 10 52
"	27	1 49 58	1 52 5	1 54 19	1 56 40	1 59 11	2 1 49	2 4 37	2 7 36	2 10 46
Nov.	6	1 49 53	1 52 0	1 54 14	1 56 35	1 59 6	2 1 44	2 4 32	2 7 30	2 10 40
"	16	1 49 49	1 51 55	1 54 10	1 56 31	1 59 1	2 1 39	2 4 27	2 7 25	2 10 35
"	26	1 49 46	1 51 52	1 54 7	1 56 28	1 58 58	2 1 36	2 4 24	2 7 22	2 10 31
Dec.	6	1 49 44	1 51 50	1 54 4	1 56 25	1 58 55	2 1 33	2 4 21	2 7 19	2 10 28
"	16	1 49 42	1 51 48	1 54 2	1 56 23	1 58 53	2 1 31	2 4 19	2 7 16	2 10 26
"	26	1 49 41	1 51 47	1 54 1	1 56 22	1 58 52	2 1 30	2 4 18	2 7 15	2 10 25
Difference for 100s.		−38″	−38″	−39″	−40″	−41″	−42″	−43″	−44″	−45″

TABLE VI.—1876.

Azimuth of POLARIS when vertical with α CYGNI, Polaris being WEST of the meridian and moving EAST.

The "Time Interval" at the head of the Table shews the time at which Polaris is vertical with the Star, reckoning from the preceding transit of Polaris.

Latitude.		47°	48°	49°	50°	51°	52°	53°	54°	55°
Time Interval.		h m s 7 12 2	h m s 7 11 50	h m s 7 11 38	h m s 7 11 26	h m s 7 11 13	h m s 7 10 59	h m s 7 10 44	h m s 7 10 29	h m s 7 10 14
		° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
Jan.	1	1 51 26	1 53 34	1 55 50	1 58 13	2 0 46	2 3 26	2 6 17	2 9 18	2 12 29
"	11	1 51 23	1 53 32	1 55 47	1 58 10	2 0 43	2 3 23	2 6 14	2 9 15	2 12 26
"	21	1 51 21	1 53 30	1 55 45	1 58 9	2 0 41	2 3 21	2 6 12	2 9 13	2 12 24
"	31	1 51 20	1 53 29	1 55 44	1 58 8	2 0 40	2 3 20	2 6 11	2 9 12	2 12 23
Feb.	10	1 51 20	1 53 29	1 55 44	1 58 8	2 0 40	2 3 20	2 6 11	2 9 12	2 12 23
"	20	1 51 22	1 53 30	1 55 46	1 58 9	2 0 41	2 3 22	2 6 12	2 9 13	2 12 25
Mar.	1	1 51 23	1 53 32	1 55 47	1 58 11	2 0 43	2 3 24	2 6 14	2 9 15	2 12 27
"	11	1 51 26	1 53 35	1 55 50	1 58 14	2 0 46	2 3 27	2 6 17	2 9 19	2 12 30
"	21	1 51 30	1 53 38	1 55 54	1 58 18	2 0 50	2 3 31	2 6 21	2 9 23	2 12 34
"	31	1 51 33	1 53 42	1 55 58	1 58 21	2 0 54	2 3 35	2 6 25	2 9 27	2 12 39
April	10	1 51 38	1 53 47	1 56 2	1 58 26	2 0 59	2 3 40	2 6 30	2 9 32	2 12 44
"	20	1 51 42	1 53 51	1 56 7	1 58 31	2 1 4	2 3 45	2 6 36	2 9 37	2 12 49
"	30	1 51 47	1 53 56	1 56 12	1 58 36	2 1 9	2 3 50	2 6 41	2 9 43	2 12 55
May	10	1 51 51	1 54 0	1 56 16	1 58 40	2 1 13	2 3 54	2 6 46	2 9 48	2 13 0
"	20	1 51 55	1 54 4	1 56 20	1 58 44	2 1 17	2 3 58	2 6 50	2 9 52	2 13 4
"	30	1 51 58	1 54 8	1 56 24	1 58 48	2 1 21	2 4 3	2 6 54	2 9 56	2 13 8
June	9	1 52 2	1 54 11	1 56 27	1 58 51	2 1 25	2 4 6	2 6 57	2 10 0	2 13 12
"	19	1 52 4	1 54 13	1 56 29	1 58 54	2 1 27	2 4 8	2 7 0	2 10 2	2 13 15
"	29	1 52 5	1 54 14	1 56 31	1 58 55	2 1 29	2 4 10	2 7 1	2 10 4	2 13 16

TABLE VI.—1876 (*continued*).

Azimuth of POLARIS when vertical with α CYGNI, Polaris being WEST of the meridian and moving EAST.

The "Time Interval" at the head of the Table shews the time at which Polaris is vertical with the Star, reckoning from the preceding transit of Polaris.

Latitude.		47°	48°	49°	50°	51°	52°	53°	54°	55°
Time Interval.		h m s 7 12 2	h m s 7 11 50	h m s 7 11 38	h m s 7 11 26	h m s 7 11 13	h m s 7 10 59	h m s 7 10 44	h m s 7 10 29	h m s 7 10 14
		° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
July	9	1 52 6	1 54 16	1 56 32	1 58 56	2 1 30	2 4 11	2 7 3	2 10 5	2 13 18
"	19	1 52 6	1 54 16	1 56 32	1 58 56	2 1 30	2 4 11	2 7 3	2 10 5	2 13 18
"	29	1 52 5	1 54 15	1 56 31	1 58 55	2 1 29	2 4 10	2 7 2	2 10 4	2 13 17
Aug.	8	1 52 4	1 54 13	1 56 30	1 58 54	2 1 27	2 4 9	2 7 0	2 10 3	2 13 15
"	18	1 52 2	1 54 11	1 56 28	1 58 52	2 1 25	2 4 7	2 6 58	2 10 0	2 13 13
"	28	1 51 59	1 54 8	1 56 25	2 58 49	2 1 22	2 4 3	2 6 55	2 9 57	2 13 9
Sept.	7	1 51 55	1 54 4	1 56 21	1 58 45	2 1 18	2 3 59	2 6 50	2 9 52	2 13 5
"	17	1 51 51	1 54 0	1 56 16	1 58 41	2 1 14	2 3 55	2 6 46	2 9 48	2 13 0
"	27	1 51 47	1 53 56	1 56 12	1 58 36	2 1 9	2 3 50	2 6 41	2 9 43	2 12 55
Oct.	7	1 51 42	1 53 51	1 56 7	1 58 31	2 1 3	2 3 44	2 6 35	2 9 37	2 12 49
"	17	1 51 37	1 53 45	1 56 1	1 58 25	2 0 58	2 3 38	2 6 29	2 9 31	2 12 43
"	27	1 51 31	1 53 40	1 55 56	1 58 19	2 0 52	2 3 33	2 6 23	2 9 25	2 12 36
Nov.	6	1 51 26	1 53 34	1 55 50	1 58 14	2 0 46	2 3 26	2 6 17	2 9 18	2 12 30
"	16	1 51 20	1 53 29	1 55 44	1 58 8	2 0 40	2 3 20	2 6 11	2 9 12	2 12 23
"	26	1 51 15	1 53 24	1 55 39	1 58 2	2 0 35	2 3 15	2 6 5	2 9 6	2 12 17
Dec.	6	1 51 10	1 53 19	1 55 34	1 57 57	2 0 29	2 3 9	2 5 59	2 9 0	2 12 11
"	16	1 51 6	1 53 14	1 55 29	1 57 52	2 0 24	2 3 4	2 5 54	2 8 55	2 12 6
"	26	1 51 2	1 53 10	1 55 25	1 57 48	2 0 20	2 3 0	2 5 50	2 8 51	2 12 1
Difference for 100s.		+35″	+36″	+37″	+37″	+38″	+39″	+40′	+41″	+42″

TABLE VII.—1876.

Azimuth of POLARIS when vertical with *α* CEPHEI, Polaris being WEST of the meridian and moving EAST.

The "Time Interval" at the head of the Table shews the time at which Polaris is vertical with the Star, reckoning from the preceding transit of Polaris.

Latitude.		47°	48°	49°	50°	51°	52°	53°	54°	55°
Time Interval.		h m s 7 46 47	h m s 7 46 36	h m s 7 46 25	h m s 7 46 13	h m s 7 46 1	h m s 7 45 48	h m s 7 45 35	h m s 7 45 21	h m s 7 45 6
		° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
Jan.	1	1 44 10	1 46 10	1 48 17	1 50 31	1 52 53	1 55 24	1 58 3	2 0 51	2 3 52
"	11	1 44 7	1 46 6	1 48 14	1 50 27	1 52 50	1 55 20	1 57 59	2 0 48	2 3 48
"	21	1 44 5	1 46 4	1 48 12	1 50 25	1 52 47	1 55 18	1 57 57	2 0 45	2 3 45
"	31	1 44 3	1 46 2	1 48 10	1 50 23	1 52 45	1 55 16	1 57 55	2 0 43	2 3 43
Feb.	10	1 44 2	1 46 2	1 48 9	1 50 22	1 52 45	1 55 15	1 57 54	2 0 42	2 3 43
"	20	1 44 3	1 46 2	1 48 10	1 50 23	1 52 45	1 55 16	1 57 55	2 0 43	2 3 43
Mar.	1	1 44 4	1 46 3	1 48 11	1 50 24	1 52 46	1 55 17	1 57 56	2 0 44	2 3 44
"	11	1 44 6	1 46 6	1 48 13	1 50 26	1 52 49	1 55 19	1 57 59	2 0 47	2 3 47
"	21	1 44 9	1 46 9	1 48 16	1 50 30	1 52 52	1 55 23	1 58 2	2 0 50	2 3 51
"	31	1 44 12	1 46 12	1 48 20	1 50 33	1 52 56	1 55 26	1 58 6	2 0 54	2 3 55
April	10	1 44 17	1 46 16	1 48 24	1 50 38	1 53 0	1 55 31	1 58 10	2 0 59	2 4 0
"	20	1 44 21	1 46 21	1 48 28	1 50 42	1 53 5	1 55 36	1 58 15	2 1 4	2 4 5
"	30	1 44 26	1 46 26	1 48 33	1 50 47	1 53 10	1 55 41	1 58 21	2 1 10	2 4 10
May	10	1 44 30	1 46 30	1 48 38	1 50 52	1 53 15	1 55 46	1 58 26	2 1 14	2 4 15
"	20	1 44 34	1 46 34	1 48 42	1 50 56	1 53 19	1 55 50	1 58 30	2 1 19	2 4 20
"	30	1 44 38	1 46 38	1 48 46	1 51 0	1 53 23	1 55 54	1 58 35	2 1 24	2 4 25
June	9	1 44 42	1 46 42	1 48 50	1 51 4	1 53 27	1 55 59	1 58 39	2 1 28	2 4 29
"	19	1 44 44	1 46 44	1 48 53	1 51 7	1 53 30	1 56 1	1 58 42	2 1 31	2 4 32
"	29	1 44 46	1 46 47	1 48 55	1 51 9	1 53 32	1 56 4	1 58 44	2 1 33	2 4 35

TABLE VII.—1876 (*continued*).

Azimuth of POLARIS, when vertical with α CEPHEI, Polaris being WEST of the meridian and moving EAST.

The "Time Interval" at the head of the Table shews the time at which Polaris is vertical with the Star, reckoning from the preceding transit of Polaris.

Latitude.		47°	48°	49°	50°	51°	52°	53°	54°	55°
Time Interval.		h m s 7 46 47	h m s 7 46 36	h m s 7 46 25	h m s 7 46 13	h m s 7 46 1	h m s 7 45 48	h m s 7 45 35	h m s 7 45 21	h m s 7 45 6
		° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
July	9	1 44 48	1 46 48	1 48 57	1 51 11	1 53 34	1 56 6	1 58 46	2 1 35	2 4 37
"	19	1 44 49	1 46 49	1 48 58	1 51 12	1 53 35	1 56 7	1 58 47	2 1 36	2 4 38
"	29	1 44 49	1 46 49	1 48 58	1 51 12	1 53 35	1 56 7	1 58 47	2 1 36	2 4 38
Aug.	8	1 44 48	1 46 49	1 48 57	1 51 11	1 53 34	1 56 6	1 58 46	2 1 36	2 4 37
"	18	1 44 47	1 46 47	1 48 56	1 51 10	1 53 33	1 56 5	1 58 45	2 1 34	2 4 36
"	28	1 44 45	1 46 45	1 48 53	1 51 8	1 53 31	1 56 2	1 58 42	2 1 32	2 4 33
Sept.	7	1 44 42	1 46 42	1 48 50	1 51 4	1 53 27	1 55 59	1 58 39	2 1 28	2 4 29
"	17	1 44 38	1 46 39	1 48 47	1 51 1	1 53 24	1 55 55	1 58 35	2 1 24	2 4 26
"	27	1 44 35	1 46 35	1 48 43	1 50 57	1 53 20	1 55 51	1 58 31	2 1 20	2 4 21
Oct.	7	1 44 30	1 46 30	1 48 38	1 50 52	1 53 15	1 55 46	1 58 26	2 1 15	2 4 16
"	17	1 44 25	1 46 25	1 48 33	1 50 47	1 53 10	1 55 40	1 58 20	2 1 9	2 4 10
"	27	1 44 20	1 46 20	1 48 28	1 50 42	1 53 4	1 55 35	1 58 15	2 1 3	2 4 4
Nov.	6	1 44 15	1 46 15	1 48 22	1 50 36	1 52 58	1 55 29	1 58 9	2 0 57	2 3 57
"	16	1 44 9	1 46 9	1 48 17	1 50 30	1 52 52	1 55 23	1 58 2	2 0 51	2 3 51
"	26	1 44 4	1 46 4	1 48 11	1 50 24	1 52 47	1 55 17	1 57 56	2 0 45	2 3 45
Dec.	6	1 43 59	1 45 59	1 48 6	1 50 19	1 52 41	1 55 12	1 57 51	2 0 39	2 3 39
"	16	1 43 54	1 45 54	1 48 1	1 50 14	1 52 36	1 55 6	1 57 45	2 0 33	2 3 33
"	26	1 43 50	1 45 49	1 47 56	1 50 9	1 52 31	1 55 1	1 57 40	2 0 28	2 3 28
Difference for 100s.		+50″	+51″	+52″	+53″	+54″	+56″	+57″	+59″	+60″

TABLE VIII.—1876.

Azimuth of POLARIS when vertical with β CEPHEI, Polaris being WEST of the meridian and moving EAST.

The "Time Interval" at the head of the Table shews the time at which Polaris is vertical with the Star, reckoning from the preceding transit of Polaris.

Latitude.		47°	48°	49°	50°	51°	52°	53°	54°	55°
Time Interval.		h m s 7 54 25	h m s 7 54 14	h m s 7 54 3	h m s 7 53 51	h m s 7 53 39	h m s 7 53 27	h m s 7 53 14	h m s 7 53 0	h m s 7 52 45
		° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
Jan.	1	1 42 15	1 44 13	1 46 18	1 48 30	1 50 49	1 53 17	1 55 53	1 58 38	2 1 36
"	11	1 42 12	1 44 9	1 46 15	1 48 26	1 50 46	1 53 13	1 55 49	1 58 35	2 1 32
"	21	1 42 9	1 44 7	1 46 12	1 48 24	1 50 43	1 53 10	1 55 46	1 58 32	2 1 29
"	31	1 42 7	1 44 5	1 46 10	1 48 22	1 50 41	1 53 8	1 55 44	1 58 30	2 1 27
Feb.	10	1 42 7	1 44 4	1 46 9	1 48 21	1 50 40	1 53 7	1 55 44	1 58 29	2 1 26
"	20	1 42 7	1 44 5	1 46 10	1 48 21	1 50 41	1 53 8	1 55 44	1 58 29	2 1 26
Mar.	1	1 42 8	1 44 5	1 46 11	1 48 22	1 50 41	1 53 9	1 55 45	1 58 30	2 1 27
"	11	1 42 10	1 44 8	1 46 13	1 48 24	1 50 44	1 53 11	1 55 47	1 58 33	2 1 30
"	21	1 42 13	1 44 11	1 46 16	1 48 27	1 50 47	1 53 14	1 55 51	1 58 36	2 1 33
"	31	1 42 16	1 44 14	1 46 19	1 48 31	1 50 50	1 53 18	1 55 54	1 58 40	2 1 37
April	10	1 42 20	1 44 18	1 46 24	1 48 35	1 50 55	1 53 22	1 55 59	1 58 44	2 1 42
"	20	1 42 25	1 44 22	1 46 28	1 48 40	1 51 0	1 53 27	1 56 4	1 58 49	2 1 47
"	30	1 42 29	1 44 27	1 46 33	1 48 45	1 51 5	1 53 32	1 56 9	1 58 55	2 1 53
May	10	1 42 34	1 44 32	1 46 37	1 48 49	1 51 9	1 53 37	1 56 14	1 59 0	2 1 58
"	20	1 42 38	1 44 36	1 46 42	1 48 54	1 51 14	1 53 42	1 56 19	1 59 5	2 2 2
"	30	1 42 42	1 44 40	1 46 46	1 48 58	1 51 18	1 53 46	1 56 23	1 59 9	2 2 7
June	9	1 42 45	1 44 44	1 46 50	1 49 2	1 51 22	1 53 50	1 56 27	1 59 14	2 2 12
"	19	1 42 48	1 44 46	1 46 52	1 49 5	1 51 25	1 53 53	1 56 30	1 59 17	2 2 15
"	29	1 42 50	1 44 49	1 46 55	1 49 7	1 51 27	1 53 56	1 56 33	1 59 19	2 2 18

TABLE VIII.—1876 (*continued*).

Azimuth of POLARIS when vertical with β CEPHEI, Polaris being WEST of the meridian and moving EAST.

The "Time Interval" at the head of the Table shews the time at which Polaris is vertical with the Star, reckoning from the preceding transit of Polaris.

Latitude.		47°	48°	49°	50°	51°	52°	53°	54°	55°
Time Interval.		h m s 7 54 25	h m s 7 54 14	h m s 7 54 3	h m s 7 53 51	h m s 7 53 39	h m s 7 53 27	h m s 7 53 14	h m s 7 53 0	h m s 7 52 45
July	9	° ′ ″ 1 42 52	° ′ ″ 1 44 51	° ′ ″ 1 46 57	° ′ ″ 1 49 9	° ′ ″ 1 51 30	° ′ ″ 1 53 58	° ′ ″ 1 56 35	° ′ ″ 1 59 22	° ′ ″ 2 2 20
"	19	1 42 53	1 44 52	1 46 58	1 49 10	1 51 31	1 53 59	1 56 36	1 59 23	2 2 21
"	29	1 42 53	1 44 52	1 46 58	1 49 10	1 51 31	1 53 59	1 56 37	1 59 23	2 2 21
Aug.	8	1 42 53	1 44 51	1 46 58	1 49 10	1 51 30	1 53 59	1 56 36	1 59 22	2 2 21
"	18	1 42 52	1 44 50	1 46 57	1 49 9	1 51 29	1 53 58	1 56 35	1 59 21	2 2 20
"	28	1 42 50	1 44 48	1 46 54	1 49 7	1 51 27	1 53 55	1 56 33	1 59 19	2 2 17
Sept.	7	1 42 47	1 44 45	1 46 51	1 49 4	1 51 24	1 53 52	1 56 29	1 59 16	2 2 14
"	17	1 42 44	1 44 42	1 46 48	1 49 0	1 51 20	1 53 49	1 56 26	1 59 12	2 2 10
"	27	1 42 40	1 44 38	1 46 44	1 48 56	1 51 17	1 53 45	1 56 22	1 59 8	2 2 6
Oct.	7	1 42 36	1 44 34	1 46 40	1 48 52	1 51 12	1 53 40	1 56 17	1 59 3	2 2 0
"	17	1 42 31	1 44 29	1 46 35	1 48 47	1 51 6	1 53 34	1 56 11	1 58 57	2 1 55
"	27	1 42 26	1 44 24	1 46 30	1 48 42	1 51 1	1 53 29	1 56 6	1 58 51	2 1 49
Nov.	6	1 42 21	1 44 19	1 46 24	1 48 36	1 50 55	1 53 23	1 56 0	1 58 45	2 1 43
"	16	1 42 15	1 44 13	1 46 19	1 48 30	1 50 50	1 53 17	1 55 53	1 58 39	2 1 36
"	26	1 42 10	1 44 8	1 46 13	1 48 24	1 50 44	1 53 11	1 55 47	1 58 33	2 1 30
Dec.	6	1 42 5	1 44 3	1 46 8	1 48 19	1 50 39	1 53 6	1 55 42	1 58 27	2 1 24
"	16	1 42 0	1 43 58	1 46 3	1 48 14	1 50 33	1 53 0	1 55 36	1 58 21	2 1 18
"	26	1 41 56	1 43 53	1 45 58	1 48 9	1 50 28	1 52 55	1 55 31	1 58 16	2 1 13
Difference for 100s.		+54″	+55″	56″	+57″	+58″	+60″	+61″	+62″	+64″

TABLE IX.—1876.

Azimuth of POLARIS when vertical with α CASSIOPEIÆ, Polaris being WEST of the meridian and moving EAST.

The "Time Interval" at the head of the Table shews the time at which Polaris is vertical with the Star, reckoning from the preceding transit of Polaris.

Latitude.		47°	48°	49°	50°	51°	52°	53°	54°	55°
Time Interval.		h m s 11 15 41	h m s 11 15 39	h m s 11 15 36	h m s 11 15 34	h m s 11 15 31	h m s 11 15 29	h m s 11 15 26	h m s 11 15 23	h m s 11 15 20
		° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
Jan.	1	0 21 5	0 21 29	0 21 55	0 22 22	0 22 51	0 23 21	0 23 54	0 24 28	0 25 4
"	11	0 21 1	0 21 25	0 21 50	0 22 17	0 22 46	0 23 16	0 23 48	0 24 23	0 24 59
"	21	0 20 56	0 21 20	0 21 45	0 22 12	0 22 41	0 23 11	0 23 43	0 24 17	0 24 53
"	31	0 20 51	0 21 15	0 21 41	0 22 7	0 22 36	0 23 6	0 23 38	0 24 12	0 24 48
Feb.	10	0 20 47	0 21 11	0 21 37	0 22 3	0 22 32	0 23 2	0 23 33	0 24 7	0 24 43
"	20	0 20 44	0 21 8	0 21 33	0 22 0	0 22 28	0 22 58	0 23 30	0 24 3	0 24 39
Mar.	1	0 20 41	0 21 5	0 21 30	0 21 57	0 22 25	0 22 55	0 23 27	0 24 0	0 24 36
"	11	0 20 39	0 21 3	0 21 28	0 21 55	0 22 23	0 22 53	0 23 24	0 23 58	0 24 33
"	21	0 20 38	0 21 2	0 21 27	0 21 54	0 22 22	0 22 52	0 23 23	0 23 57	0 24 33
"	31	0 20 38	0 21 2	0 21 27	0 21 54	0 22 22	0 22 52	0 23 23	0 23 57	0 24 33
April	10	0 20 39	0 21 3	0 21 28	0 21 55	0 22 23	0 22 53	0 23 24	0 23 58	0 24 33
"	20	0 20 41	0 21 5	0 21 30	0 21 56	0 22 25	0 22 55	0 23 26	0 24 0	0 24 36
"	30	0 20 44	0 21 8	0 21 33	0 22 0	0 22 28	0 22 58	0 23 29	0 24 3	0 24 39
May	10	0 20 47	0 21 11	0 21 36	0 22 3	0 22 31	0 23 1	0 23 33	0 24 7	0 24 43
"	20	0 20 50	0 21 14	0 21 40	0 22 7	0 22 35	0 23 5	0 23 37	0 24 11	0 24 47
"	30	0 20 55	0 21 19	0 21 44	0 22 11	0 22 40	0 23 10	0 23 42	0 24 16	0 24 52
June	9	0 20 59	0 21 24	0 21 49	0 22 16	0 22 45	0 23 15	0 23 47	0 24 21	0 24 57
"	19	0 21 4	0 21 28	0 21 53	0 22 21	0 22 50	0 23 20	0 23 52	0 24 27	0 25 3
"	29	0 21 8	0 21 33	0 21 59	0 22 26	0 22 55	0 23 25	0 23 57	0 24 32	0 25 8

TABLE IX.—1876 (*continued*).

Azimuth of POLARIS when vertical with α CASSIOPEIÆ, Polaris being WEST of the meridian and moving EAST.

The "Time Interval" at the head of the Table shews the time at which Polaris is vertical with the Star, reckoning from the preceding transit of Polaris.

Latitude.		47°	48°	49°	50°	51°	52°	53°	54°	55°
Time Interval.		h m s 11 15 41	h m s 11 15 39	h m s 11 15 36	h m s 11 15 34	h m s 11 15 31	h m s 11 15 29	h m s 11 15 26	h m s 11 15 23	h m s 11 15 20
		° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
July	9	0 21 13	0 21 38	0 22 4	0 22 31	0 23 0	0 23 30	0 24 3	0 24 37	0 25 14
"	19	0 21 18	0 21 42	0 22 8	0 22 36	0 23 5	0 23 35	0 24 8	0 24 43	0 25 19
"	29	0 21 22	0 21 46	0 22 12	0 22 40	0 23 9	0 23 40	0 24 13	0 24 47	0 25 24
Aug.	8	0 21 25	0 21 50	0 22 16	0 22 44	0 23 13	0 23 44	0 24 17	0 24 51	0 25 28
"	18	0 21 29	0 21 54	0 22 20	0 22 47	0 23 17	0 23 48	0 24 20	0 24 55	0 25 32
"	28	0 21 32	0 21 56	0 22 23	0 22 50	0 23 20	0 23 51	0 24 24	0 24 59	0 25 36
Sept.	7	0 21 33	0 21 58	0 22 25	0 22 52	0 23 22	0 23 53	0 24 26	0 25 1	0 25 38
"	17	0 21 35	0 22 0	0 22 26	0 22 54	0 23 23	0 23 54	0 24 27	0 25 2	0 25 40
"	27	0 21 36	0 22 1	0 22 27	0 22 55	0 23 24	0 23 56	0 24 29	0 25 4	0 25 41
Oct.	7	0 21 36	0 22 1	0 22 27	0 22 55	0 23 24	0 23 56	0 24 29	0 25 4	0 25 41
"	17	0 21 35	0 22 0	0 22 26	0 22 54	0 23 24	0 23 55	0 24 28	0 25 3	0 25 40
"	27	0 21 34	0 21 59	0 22 25	0 22 53	0 23 22	0 23 53	0 24 26	0 25 1	0 25 38
Nov.	6	0 21 32	0 21 57	0 22 23	0 22 51	0 23 20	0 23 51	0 24 24	0 24 59	0 25 36
"	16	0 21 29	0 21 54	0 22 20	0 22 48	0 23 17	0 23 48	0 24 21	0 24 56	0 25 33
"	26	0 21 26	0 21 51	0 22 17	0 22 44	0 23 13	0 23 44	0 24 17	0 24 52	0 25 29
Dec.	6	0 21 22	0 21 47	0 22 13	0 22 40	0 23 9	0 23 40	0 24 13	0 24 47	0 25 24
"	16	0 21 18	0 21 42	0 22 8	0 22 36	0 23 5	0 23 35	0 24 8	0 24 43	0 25 19
"	25	0 21 13	0 21 37	0 22 3	0 22 31	0 22 59	0 23 30	0 24 2	0 24 37	0 25 14
Difference for 100s.		+106″	+108″	+110″	+112″	+114″	+117″	+120″	+122″	+125″

TABLE X.—1876.

Azimuth of POLARIS when vertical with α PERSEI, Polaris being EAST of the meridian and moving EAST.

The "Time Interval" at the head of the Table shews the time at which Polaris is identical with the Star, reckoning from the next transit of Polaris.

Latitude.		47°	48°	49°	50°	51°	52°	53°	54°	55°
Time Interval.		h m s 9 50 6	h m s 9 49 59	h m s 9 49 52	h m s 9 49 45	h m s 9 49 38	h m s 9 49 31	h m s 9 49 23	h m s 9 49 15	h m s 9 49 6
		° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
Jan.	1	1 1 43	1 2 54	1 4 10	1 5 29	1 6 53	1 8 22	1 9 57	1 11 37	1 13 23
"	11	1 1 47	1 2 58	1 4 14	1 5 33	1 6 57	1 8 26	1 10 1	1 11 41	1 13 27
"	21	1 1 51	1 3 2	1 4 18	1 5 37	1 7 1	1 8 31	1 10 6	1 11 46	1 13 32
"	31	1 1 55	1 3 7	1 4 23	1 5 42	1 7 6	1 8 36	1 10 11	1 11 51	1 13 38
Feb.	10	1 2 0	1 3 11	1 4 27	1 5 47	1 7 11	1 8 41	1 10 16	1 11 56	1 13 43
"	20	1 2 4	1 3 16	1 4 32	1 5 52	1 7 16	1 8 46	1 10 21	1 12 2	1 13 48
Mar.	1	1 2 9	1 3 20	1 4 37	1 5 56	1 7 21	1 8 51	1 10 26	1 12 7	1 13 54
"	11	1 2 13	1 3 25	1 4 41	1 6 1	1 7 26	1 8 56	1 10 31	1 12 12	1 13 39
"	21	1 2 17	1 3 28	1 4 45	1 6 5	1 7 30	1 8 59	1 10 35	1 12 16	1 14 3
"	31	1 2 20	1 3 31	1 4 48	1 6 8	1 7 33	1 9 3	1 10 39	1 12 20	1 14 7
April	10	1 2 22	1 3 34	1 4 51	1 6 11	1 7 35	1 9 5	1 10 41	1 12 22	1 14 10
"	20	1 2 24	1 3 35	1 4 52	1 6 12	1 7 37	1 9 7	1 10 43	1 12 24	1 14 11
"	30	1 2 24	1 3 36	1 4 53	1 6 13	1 7 38	1 9 8	1 10 44	1 12 25	1 14 12
May	10	1 2 24	1 3 35	1 4 52	1 6 12	1 7 37	1 9 7	1 10 43	1 12 24	1 14 11
"	20	1 2 22	1 3 34	1 4 51	1 6 11	1 7 36	1 9 6	1 10 42	1 12 23	1 14 10
"	30	1 2 21	1 3 32	1 4 49	1 6 9	1 7 34	1 9 4	1 10 40	1 12 21	1 14 8
June	9	1 2 18	1 3 29	1 4 46	1 6 6	1 7 31	1 9 0	1 10 36	1 12 17	1 14 4
"	19	1 2 14	1 3 26	1 4 42	1 6 2	1 7 27	1 8 56	1 10 32	1 12 13	1 14 0
"	29	1 2 10	1 3 22	1 4 38	1 5 58	1 7 22	1 8 52	1 10 28	1 12 8	1 13 55

TABLE X.—1876 (*continued*).

Azimuth of POLARIS when vertical with *a* PERSEI, Polaris being EAST of the meridian and moving EAST.

The "Time Interval" at the head of the Table shews the time at which Polaris is vertical with the Star, reckoning from the next transit of Polaris.

Latitude.		47°	48°	49°	50°	51°	52°	53°	54°	55°
Time Interval.		h m s 9 50 6	h m s 9 49 59	h m s 9 49 52	h m s 9 49 45	h m s 9 49 38	h m s 9 49 31	h m s 9 49 23	h m s 9 49 15	h m s 9 49 6
		° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
July	9	1 2 6	1 3 17	1 4 33	1 5 53	1 7 17	1 8 47	1 10 23	1 12 3	1 13 50
"	19	1 2 0	1 3 12	1 4 28	1 5 47	1 7 12	1 8 41	1 10 17	1 11 57	1 13 44
"	29	1 1 55	1 3 7	1 4 23	1 5 42	1 7 6	1 8 36	1 10 11	1 11 51	1 13 38
Aug.	8	1 1 50	1 3 1	1 4 17	1 5 37	1 7 1	1 8 30	1 10 5	1 11 45	1 13 31
"	18	1 1 45	1 2 56	1 4 12	1 5 31	1 6 55	1 8 24	1 9 59	1 11 39	1 13 25
"	28	1 1 39	1 2 50	1 4 6	1 5 25	1 6 49	1 8 18	1 9 53	1 11 33	1 13 19
Sept.	7	1 1 34	1 2 45	1 4 1	1 5 20	1 6 44	1 8 12	1 9 47	1 11 27	1 13 13
"	17	1 1 30	1 2 40	1 3 56	1 5 15	1 6 39	1 8 7	1 9 42	1 11 22	1 13 7
"	27	1 1 25	1 2 36	1 3 51	1 5 10	1 6 34	1 8 2	1 9 37	1 11 16	1 13 2
Oct.	7	1 1 21	1 2 32	1 3 47	1 5 6	1 6 29	1 7 58	1 9 32	1 11 12	1 12 57
"	17	1 1 18	1 2 29	1 3 44	1 5 2	1 6 26	1 7 54	1 9 29	1 11 8	1 12 53
"	27	1 1 15	1 2 26	1 3 41	1 5 0	1 6 23	1 7 51	1 9 26	1 11 5	1 12 50
Nov.	6	1 1 13	1 2 24	1 3 39	1 4 58	1 6 21	1 7 49	1 9 23	1 11 3	1 12 48
"	16	1 1 12	1 2 23	1 3 38	1 4 56	1 6 20	1 7 48	1 9 22	1 11 1	1 12 46
"	26	1 1 12	1 2 23	1 3 38	1 4 56	1 6 20	1 7 48	1 9 22	1 11 1	1 12 46
Dec.	6	1 1 13	1 2 23	1 3 39	1 4 57	1 6 20	1 7 49	1 9 23	1 11 2	1 12 47
"	16	1 1 14	1 2 25	1 3 40	1 4 58	1 6 22	1 7 50	1 9 24	1 11 4	1 12 49
"	26	1 1 17	1 2 27	1 3 43	1 5 1	1 6 24	1 7 53	1 9 27	1 11 6	1 12 52
Difference for 100°.		−91″	−92″	−94″	−96″	−98″	−100″	−103″	−105″	−108″

TABLE A.

Greatest Elongation of Polaris.

CORRECTIONS for Minutes of Latitude always *additive* to head.

Latitude.	47°	48°	49°	50°	51°	52°	53°	54°
′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
1	0 2	0 2	0 2	0 3	0 3	0 3	0 3	0 3
2	0 4	0 5	0 5	0 5	0 6	0 6	0 6	0 7
3	0 7	0 7	0 7	0 8	0 8	0 9	0 9	0 10
4	0 9	0 9	0 10	0 10	0 11	0 12	0 12	0 13
5	0 11	0 12	0 12	0 13	0 14	0 15	0 16	0 17
6	0 13	0 14	0 15	0 16	0 17	0 18	0 19	0 20
7	0 16	0 16	0 17	0 18	0 19	0 21	0 22	0 23
8	0 18	0 19	0 20	0 21	0 22	0 24	0 25	0 27
9	0 20	0 21	0 22	0 24	0 25	0 27	0 28	0 30
10	0 22	0 23	0 25	0 26	0 28	0 29	0 31	0 33
11	0 24	0 26	0 27	0 29	0 31	0 32	0 34	0 37
12	0 27	0 28	0 30	0 31	0 33	0 35	0 37	0 40
13	0 29	0 31	0 32	0 34	0 36	0 38	0 41	0 43
14	0 31	0 33	0 35	0 37	0 39	0 41	0 44	0 46
15	0 33	0 35	0 37	0 39	0 42	0 44	0 47	0 50
16	0 36	0 38	0 40	0 42	0 44	0 47	0 50	0 53
17	0 38	0 40	0 42	0 45	0 47	0 50	0 53	0 56
18	0 40	0 42	0 45	0 47	0 50	0 53	0 56	1 0
19	0 42	0 45	0 47	0 50	0 53	0 56	0 59	1 3
20	0 44	0 47	0 50	0 52	0 56	0 59	1 2	1 6
21	0 47	0 49	0 52	0 55	0 58	1 2	1 6	1 10
22	0 49	0 52	0 55	0 58	1 1	1 5	1 9	1 13
23	0 51	0 54	0 57	1 1	1 4	1 8	1 12	1 17
24	0 54	0 57	1 0	1 3	1 7	1 11	1 15	1 20
25	0 56	0 59	1 2	1 6	1 10	1 14	1 18	1 23
26	0 58	1 1	1 5	1 9	1 13	1 17	1 22	1 27
27	1 0	1 4	1 7	1 11	1 15	1 20	1 25	1 30
28	1 3	1 6	1 10	1 14	1 18	1 23	1 28	1 33
29	1 5	1 9	1 12	1 17	1 21	1 26	1 31	1 37
30	1 7	1 11	1 15	1 19	1 24	1 29	1 34	1 40

TABLE A. (*continued*).

Greatest Elongation of Polaris.

CORRECTIONS for Minutes of Latitude always *additive* to head.

Latitude.	47°	48°	49°	50°	51°	52°	53°	54°
′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
31	1 9	1 13	1 17	1 22	1 27	1 32	1 38	1 44
32	1 12	1 16	1 20	1 25	1 30	1 35	1 41	1 47
33	1 14	1 18	1 22	1 27	1 32	1 38	1 44	1 50
34	1 16	1 20	1 25	1 30	1 35	1 41	1 47	1 54
35	1 18	1 23	1 27	1 33	1 38	1 44	1 50	1 57
36	1 21	1 25	1 30	1 35	1 41	1 47	1 54	2 1
37	1 23	1 28	1 33	1 38	1 44	1 50	1 57	2 4
38	1 25	1 30	1 35	1 41	1 47	1 53	2 0	2 7
39	1 28	1 32	1 38	1 43	1 49	1 56	2 3	2 11
40	1 30	1 35	1 40	1 46	1 52	1 59	2 6	2 14
41	1 32	1 37	1 43	1 49	1 55	2 2	2 10	2 18
42	1 34	1 40	1 45	1 52	1 58	2 5	2 13	2 21
43	1 37	1 42	1 48	1 54	2 1	2 8	2 16	2 24
44	1 39	1 45	1 50	1 57	2 4	2 11	2 19	2 28
45	1 41	1 47	1 53	2 0	2 7	2 14	2 23	2 31
46	1 44	1 49	1 56	2 2	2 10	2 17	2 26	2 35
47	1 46	1 52	1 58	2 5	2 12	2 20	2 29	2 38
48	1 48	1 54	2 1	2 8	2 15	2 23	2 32	2 42
49	1 51	1 57	2 3	2 11	2 18	2 27	2 36	2 45
50	1 53	1 59	2 6	2 13	2 21	2 30	2 39	2 49
51	1 55	2 2	2 8	2 16	2 24	2 33	2 42	2 52
52	1 58	2 4	2 11	2 19	2 27	2 36	2 45	2 56
53	2 0	2 7	2 14	2 22	2 30	2 39	2 49	2 59
54	2 2	2 9	2 16	2 24	2 33	2 42	2 52	3 3
55	2 4	2 11	2 19	2 27	2 36	2 45	2 55	3 6
56	2 7	2 14	2 21	2 30	2 38	2 48	2 58	3 9
57	2 9	2 16	2 24	2 32	2 41	2 51	3 2	3 13
58	2 11	2 19	2 27	2 35	2 44	2 54	3 5	3 16
59	2 14	2 21	2 29	2 38	2 47	2 57	3 8	3 20

TABLE B.

Azimuth of Polaris when vertical with certain Stars.

CORRECTIONS for Minutes of Latitude always *additive*, from Latitude 50° 1′ to Latitude 50° 59′.

Minutes of Latitude.	η Ursæ Majoris.	β Draconis.	γ Draconis.	α Cygni.	α Cephei.	β Cephei.	α Cassiopeiæ.	α Persei.	Capella.	ι Ursæ Majoris.	θ Ursæ Majoris.	α Ursæ Majoris.	γ Ursæ Majoris.
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
1	0 0	0 2	0 2	0 2	0 2	0 2	0 0	0 1	0 2	0 2	0 2	0 1	0 1
2	0 1	0 5	0 5	0 5	0 5	0 4	0 1	0 3	0 4	0 5	0 4	0 3	0 2
3	0 1	0 7	0 7	0 7	0 7	0 7	0 1	0 4	0 7	0 7	0 6	0 4	0 3
4	0 1	0 9	0 10	0 10	0 9	0 9	0 2	0 5	0 9	0 9	0 9	0 6	0 4
5	0 2	0 11	0 12	0 12	0 11	0 11	0 2	0 7	0 11	0 12	0 11	0 7	0 5
6	0 2	0 14	0 15	0 15	0 14	0 13	0 3	0 8	0 13	0 14	0 13	0 9	0 6
7	0 2	0 16	0 17	0 17	0 16	0 16	0 3	0 9	0 16	0 16	0 15	0 10	0 7
8	0 3	0 18	0 20	0 20	0 18	0 18	0 4	0 11	0 18	0 19	0 17	0 12	0 7
9	0 3	0 21	0 22	0 22	0 21	0 20	0 4	0 12	0 20	0 21	0 19	0 13	0 8
10	0 3	0 23	0 24	0 25	0 23	0 22	0 5	0 13	0 22	0 23	0 21	0 14	0 9
11	0 3	0 25	0 27	0 27	0 25	0 25	0 5	0 15	0 25	0 26	0 24	0 16	0 10
12	0 4	0 28	0 29	0 30	0 28	0 27	0 6	0 16	0 27	0 28	0 26	0 17	0 11
13	0 4	0 30	0 32	0 32	0 30	0 29	0 6	0 18	0 29	0 31	0 28	0 19	0 12
14	0 4	0 32	0 34	0 35	0 32	0 31	0 7	0 19	0 31	0 33	0 30	0 20	0 13
15	0 5	0 34	0 37	0 37	0 34	0 34	0 7	0 20	0 34	0 35	0 32	0 22	0 14
16	0 5	0 37	0 39	0 40	0 37	0 36	0 8	0 22	0 36	0 38	0 34	0 23	0 15
17	0 5	0 39	0 42	0 42	0 39	0 38	0 8	0 23	0 38	0 40	0 37	0 25	0 16
18	0 6	0 41	0 44	0 45	0 41	0 40	0 9	0 24	0 40	0 42	0 39	0 26	0 17
19	0 6	0 44	0 47	0 47	0 44	0 43	0 9	0 26	0 43	0 45	0 41	0 28	0 18
20	0 6	0 46	0 49	0 50	0 46	0 45	0 10	0 27	0 45	0 47	0 43	0 29	0 19
21	0 7	0 48	0 51	0 52	0 48	0 47	0 10	0 28	0 47	0 49	0 45	0 30	0 20
22	0 7	0 51	0 54	0 55	0 51	0 50	0 11	0 30	0 50	0 52	0 47	0 32	0 21
23	0 7	0 53	0 56	0 57	0 53	0 52	0 11	0 31	0 52	0 54	0 50	0 33	0 22
24	0 8	0 56	0 59	1 0	0 55	0 54	0 11	0 33	0 54	0 57	0 52	0 35	0 23
25	0 8	0 58	1 1	1 2	0 58	0 56	0 12	0 34	0 56	0 59	0 54	0 36	0 24
26	0 8	1 0	1 4	1 5	1 0	0 59	0 12	0 35	0 59	1 1	0 56	0 38	0 25
27	0 9	1 3	1 6	1 7	1 2	1 1	0 13	0 37	1 1	1 4	0 59	0 39	0 26
28	0 9	1 5	1 9	1 10	1 5	1 3	0 13	0 38	1 3	1 6	1 1	0 41	0 26
29	0 9	1 8	1 11	1 12	1 7	1 6	0 14	0 40	1 6	1 9	1 3	0 42	0 27
30	0 10	1 10	1 13	1 15	1 9	1 8	0 14	0 41	1 8	1 11	1 5	0 43	0 28

TABLE B. (*continued*).

Azimuth of Polaris when vertical with certain Stars.

CORRECTIONS for Minutes of Latitude always *additive*, from Latitude 50° 1′ to Latitude 50° 59′.

Minutes of Latitude.	η Ursæ Majoris.	β Draconis.	γ Draconis.	α Cygni.	α Cephei.	β Cephei.	α Cassiopeiæ.	α Persei.	Capella.	ι Ursæ Majoris.	θ Ursæ Majoris.	α Ursæ Majoris.	γ Ursæ Majoris.
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
31	0 10	1 12	1 16	1 17	1 12	1 10	0 15	0 42	1 10	1 13	1 8	0 45	0 29
32	0 10	1 15	1 18	1 20	1 14	1 13	0 15	0 44	1 13	1 16	1 10	0 46	0 30
33	0 11	1 17	1 21	1 22	1 17	1 15	0 16	0 45	1 15	1 18	1 12	0 48	0 31
34	0 11	1 20	1 23	1 25	1 19	1 17	0 16	0 47	1 17	1 21	1 14	0 49	0 32
35	0 11	1 22	1 26	1 27	1 21	1 19	0 17	0 48	1 19	1 23	1 17	0 51	0 33
36	0 12	1 24	1 28	1 30	1 24	1 22	0 17	0 49	1 22	1 25	1 19	0 52	0 34
37	0 12	1 27	1 31	1 32	1 26	1 24	0 18	0 51	1 24	1 28	1 21	0 54	0 35
38	0 12	1 29	1 33	1 35	1 28	1 26	0 18	0 52	1 26	1 30	1 23	0 55	0 36
39	0 12	1 32	1 36	1 37	1 31	1 29	0 19	0 54	1 29	1 33	1 26	0 57	0 37
40	0 13	1 34	1 38	1 40	1 33	1 31	0 19	0 55	1 31	1 35	1 28	0 58	0 38
41	0 13	1 36	1 41	1 43	1 35	1 33	0 20	0 56	1 33	1 37	1 30	0 59	0 39
42	0 13	1 39	1 43	1 45	1 38	1 36	0 20	0 58	1 36	1 40	1 32	1 1	0 40
43	0 14	1 41	1 46	1 48	1 40	1 38	0 21	0 59	1 38	1 42	1 35	1 2	0 41
44	0 14	1 44	1 48	1 50	1 43	1 40	0 21	1 1	1 41	1 45	1 37	1 4	0 42
45	0 14	1 46	1 51	1 53	1 45	1 43	0 22	1 2	1 43	1 47	1 39	1 5	0 43
46	0 15	1 48	1 53	1 55	1 47	1 45	0 22	1 3	1 45	1 50	1 41	1 7	0 44
47	0 15	1 51	1 56	1 58	1 50	1 47	0 23	1 5	1 48	1 52	1 44	1 8	0 45
48	0 15	1 53	1 58	2 0	1 52	1 50	0 23	1 6	1 50	1 55	1 46	1 10	0 46
49	0 16	1 56	2 1	2 3	1 55	1 52	0 24	1 8	1 53	1 57	1 48	1 11	0 47
50	0 16	1 58	2 3	2 5	1 57	1 54	0 24	1 9	1 55	2 0	1 50	1 13	0 48
51	0 16	2 0	2 6	2 8	1 59	1 57	0 25	1 10	1 57	2 2	1 53	1 14	0 49
52	0 17	2 3	2 9	2 11	2 2	1 59	0 25	1 12	2 0	2 4	1 55	1 16	0 50
53	0 17	2 5	2 11	2 13	2 4	2 2	0 26	1 13	2 2	2 7	1 57	1 17	0 51
54	0 17	2 8	2 14	2 16	2 7	2 4	0 26	1 15	2 5	2 9	1 59	1 19	0 52
55	0 18	2 10	2 16	2 18	2 9	2 6	0 27	1 16	2 7	2 12	2 2	1 20	0 53
56	0 18	2 12	2 19	2 21	2 11	2 9	0 27	1 17	2 9	2 14	2 4	1 22	0 54
57	0 18	2 15	2 21	2 23	2 14	2 11	0 28	1 19	2 12	2 17	2 6	1 23	0 55
58	0 19	2 17	2 24	2 26	2 16	2 13	0 28	1 20	2 14	2 19	2 8	1 25	0 56
59	0 19	2 20	2 26	2 28	2 19	2 16	0 29	1 22	2 17	2 22	2 11	1 26	0 57